

**REMARKS**

Entry of the foregoing, reexamination and reconsideration of the subject application are respectfully requested in light of the amendments above and the comments which follow.

As correctly noted in the Office Action Summary, claims 1-6 were pending. By the present response, claims 1-4 and 6 have been amended, claim 7 has canceled, and claims 1-7 have been added. Thus, upon entry of the present response, claims 1-7 are pending and await further consideration on the merits.

Support for the foregoing amendments can be found, for example, in at least the following locations in the original disclosure: the original claims.

***CLAIM OBJECTIONS***

Claim 1 is objected to because of informalities. Claim 1 has been amended to address the objection. Thus, reconsideration and withdrawal of the objection is respectfully requested.

***CLAIM REJECTIONS UNDER 35 U.S.C. §112***

Claims 1-6 stand rejected under 35 U.S.C. §112, second paragraph, on the grounds set forth in paragraph 4 of the Official Action.

By the present response, applicants have amended claims 1-4 and 6 in a manner which addresses the above-noted rejection.

It is stated on page 3 of the Official Action with respect to the grounds of rejection of claim 1 that:

Furthermore, Fig. 1 of instant invention clearly shows that the contact lamina is not directly attached to the semiconductor substrate. Thus, it is not clear how the alloying partner within the contact lamina forms an eutectic layer between the alloying partner and the semiconductor material.

While the contact lamina of the present invention may not be directly attached to the semiconductor substrate, it is nonetheless possible for the recited eutectic to be formed. This is because the electrode metallization and electrically conductive coating comprising a base layer have a relatively small thickness and, in the event of a short circuit, these layers are permeable to melted materials (e.g., via cracks in the thin layers) and thus capable of forming the recited eutectic with the semiconductor material.

In light of the above, reconsideration and withdrawal of the rejection is respectfully requested.

***CLAIM REJECTIONS UNDER 35 U.S.C. §102***

Claims 1-3, 5 and 6 stand rejected under 35 U.S.C. §102(c) as being anticipated by U.S. Patent No. 6,686,658 to Kodama et al. (hereafter "*Kodama et al.*") on the grounds set forth in paragraph 6 of the Official Action. For at least the reasons noted below, this rejection should be withdrawn.

The present invention is directed to a power semiconductor module which represents an improvement over such devices occurring in the state of the art. In particular, as discussed on pages 2-3 of the present specification, conventional arrangements of this type are susceptible to a fixed material connection which may be formed between a first main electrode and a foil or lamina which can be separated only by destruction of the first main electrode and thus of the

semiconductor chip device. Another issue occurs when, due to different coefficient of thermal expansion between the contact element and semiconductor chip, the electrode metallization can become detached over the course of time, thus also resulting in failure of the semiconductor device. Yet another problem associated with the state of the art is associated with the fact that semiconductor modules are not sealed in an airtight fashion. Conventional contact elements which are formed from aluminum are thus susceptible to the formation of an aluminum oxide film thereon. The aluminum oxide acts as an electrical insulator, and upon exposure to current generates heat, which may in turn destroy the power semiconductor module.

A power semiconductor module constructed according to the principles of the present invention is set forth in amended claim 1. Amended claim 1 recites:

1. *A power semiconductor module comprising*
- *at least one semiconductor chip made of a semiconductor material and having first and a second main electrodes,*
- *first and second main connections,*
- *a contact lamina in electrical contact with the first main electrode and the first main connection,*
- *the contact lamina containing an alloying partner capable of forming a eutectic between the alloying partner and the semiconductor material,*
- *the contact lamina being coated with an electrically conductive protective layer,*
- *wherein*
- *the protective layer has at least one electrically conductive base layer applied on the contact lamina, and*
- *an electrically conductive surface layer, which forms an external contact area,*
- *and in that*
- *the base layer and the surface layer substantially comprise different materials.*

The power semiconductor module set forth in amended claim 1 is not anticipated by *Kodama et al.*

*Kodama et al.* is directed to a semiconductor device including arrangements to provide a uniform press contact, and a converter using the same.

As evident from the above, claim 1 requires a contact lamina coated with an electrical conductive protective layer. The protective layer of claim 1 includes an electrically conductive base layer on the contact lamina, and an electrically conductive surface layer which forms an external contact area. The base layer and the surface layer are formed from substantially different materials. It is asserted on page 5 of the Official Action that the intermediate electrode 13, Au plated film 15 and nickel-plated film 16 described in association with the embodiment of Figures 7-8 of *Kodama et al.* satisfy these aspects of amended claim 1. These assertions are respectfully traversed.

As explicitly disclosed at column 9, lines 14-15 of *Kodama et al.*, the nickel-plated film 16 "is formed on the surface of the common electrode plate" (emphasis added). Thus, this nickel-plated film 16 does not coat anything equivalent to the contact lamina, as required by amended claim 1. As disclosed, for example, on page 7 of the present specification, provision of the surface layer on the contact lamina provides the present invention with the advantage that it prevents an undesirable fusion between the first electrode metallization and the contact lamina. In *Kodama et al.*, the nickel-plated film is not arranged between the electrode metallization and the contact lamina. Therefore, the two layers of *Kodama et al.* have an order and arrangement which does not correspond to the requirements set forth in amended claim 1. Thus, for at least the reasons noted above, *Kodama et al.* fails to anticipate the power semiconductor module specified in amended claim 1.

The remaining claims depend from claim 1. Thus, these claims are also distinguishable over *Kodama et al.* for at least the same reasons noted above.

**ALLOWABLE SUBJECT MATTER**

Applicants note with appreciation the indication that claim 4 contains allowable subject matter, as noted in paragraph 7 of the Official Action.

By the present response, applicants have rewritten claim 4 in independent form. Thus, an indication of the allowability of claim 4, along with the remaining claims, is respectfully requested in the next Official Action.

**CONCLUSION**

From the foregoing, further and favorable action in the form of a Notice of Allowance is earnestly solicited. Should the Examiner feel that any issues remain, it is requested that the undersigned be contacted so that any such issues may be adequately addressed and prosecution of the instant application expedited.

Respectfully submitted,

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Date: June 27, 2008

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